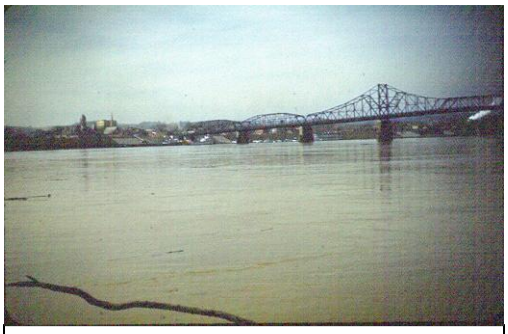
Ohio RFC (originally known as the Cincinnati RFC)

Roy Lundquist was the founding father of the Cincinnati River Forecast Center, so appointed by the Office of Hydrology. Carl Relyea recalls Mr. Lundquist had been Meteorologist-in-Charge at Harford, CT with River District duties. He was a civil engineer, and he had done studies there on snow melt on the airport runways. About ten years after his appointment, he took a noon walk along Fifth Street. Near the fountain, I (Carl Relyea) met him while on my own lunch time stroll. When I returned to the office, I was given the sad news that Mr. Lundquist had collapsed at his desk as Hydrologist-in-Charge. He was a fine man and friend.

Photo taken November 1949, from left to right: R.Lundquist, V.Maellmar, G.Marth, M.Richards, and W.Ray

Carl Relyea began his hydrology career working at the Cincinnati Weather Bureau office which also included a River District Office. He started there the fall before the Ohio River flood of December 1950. As he recalls, he was away at the office for long hours, barely had time to come home and catch some sleep before he had to return for more 14 to 16 hour stretches. Quite an initiation to the River District Office!



Ohio River near Cincinnati, Ohio
Flood of December 1950

Photo taken November 1949, from left to right: R.Lundquist, L.Hahn, M.Richards, G.Marth, and W.Ray.

While part of the RDO staff, Mr. Relyea spent quite a bit of time in the field. As Mr.Relyea recalls, back then the reporting network of river and rainfall observers was maintained by the District Offices. He made trips to the field for this purpose to select, train and supervise observers, as well as, to install and maintain field equipment such as river and rainfall gages. He also did some surveying to determine/check the zero elevation of a gage or flood area elevation above mean sea level (MSL). The research for and writing of river gage descriptions was also important part of his job. Many of the observers were characters. In Cynthiana, Kentucky, he once found the rain gage on the edge of the front porch (the observer did not want to get wet). Mr. Relyea relocated it to the lawn for proper exposure.

In Berea Water Works in Kentucky, after having to ask an excellent rainfall observer to mail the daily report card ***daily*** rather than in batches, she replied that the mail box was a long walk down the drive. Then she asked him to dinner, requesting him to say grace. I felt it was a tryout for "size" as she closely observed everything I did at the table.

In 1955 Mr. Relyea transferred to the Cincinnati RFC. Mr. Relyea remembers attending a two-week conference at Colorado State University. Most of the sessions were on river mechanics. The son of Albert Einstein spoke at one of the sessions. He said that his father had become interested in river flow mechanics, but found it too complicated! Mr. Relyea went on to be the Hydrologist-in-Charge from 1965 to his retirement in 1977.

On Mr. Relyea's first day on the job at the RFC he met Marshall Richards. They both had been Army Air Force weather officers. Mr. Richards had a degree in Civil Engineering from Purdue. He was about to leave the RFC to form and to head a special Weather Bureau unit at the TVA to study past storms and forecast

past floods. When that was finished, Mr. Richards was called to the Office of Hydrology in Washington, DC.

Charles "Chuck" Nevins: I remember a work trip I took with Lew (Hahn) in Ohio. I was driving but Lew knew exactly where to go. I asked him — where I was supposed to make a right turn and he replied, "Just follow this road for 37 telephone poles and then turn right." sounded funny to me, but it worked.

Allen Flanders: Although I am not one of the original crew at Cincinnati my arrival in the fall of 1952 probably places me in the 1st generation group. Here is a little background on how I got to the RFC. It came about following my stint in the Cleveland WBAS after graduation from the NYU College of Engineering in 1951 where I took some hydrology courses along with meteorology. Al Shands who was Deputy to Bud Hiatt, then Chief of the Hydrologic Services Division, telephoned the MIC in Cleveland asking about me and whether I might be interested in transferring to the RFC. I asked the staff in Cleveland what is a RFC. The reply was - take it, its day work so I was off to the RFC. In those days the RFC worked an 8-hour day 5-days a week. The RFC was housed in the Federal Building with no air conditioning. In the summer months it got so hot and sticky paper on your desk would stick to your arms - the good old days. Roy Lundquist was HIC, an example setter. He ran the office very well, always participated in the daily forecasting and did forecast procedure work as well. A fine man. Others at that time in the office were George Marth, Bill Willard, Bill Winston and two others who left shortly after my arrival. Later came Carl Relyea, Bob Ellis and Bob Burnash (who later became HIC in Sacramento) and Vivian ,our secretary, and of course fastest typist. The forecasting then was based upon empirical procedures, many just stage relations from an upstream point to the next point downstream. On the main stem as we called the Ohio River, IO (inflow - outflow) charts had been developed. Discharge values were plotted against the values at the next forecast point downstream and so forth down the Ohio based upon historical records. Local runoff then had to be added in on the special forms we produced on mimeograph machines to sum up discharge values as you worked your way downstream. Next door to the RFC was the Cincinnati WBO which supplied us the rainfall reports from the first order stations in the Ohio Basin. All the co-op rainfall and river reports came to the RFC from the RD plotted all the rainfall reports. Then using API values over the basin we estimated runoff by going through a chart which was called the rainfall/runoff calculation that took into account the week number of the year and soil conditions. The runoff values were then plotted on acetate covered map of the basin. Using these runoff values each forecaster then proceeded to come up with discharge values and plot a hydrograph for each forecast point. We did a pretty good job I thought. We usually got the forecasts out between 10 am and noon. They had to be manually sent over teletype (TWX) at 35 WPM to each RDO. On occasion we would go into the field with the hydro tech to visit gauging stations and cooperative observers. We made a special visit one day to an observer who was faking the reports. We showed him how we knew by comparing river reports

upstream and downstream of him. After bringing this to his attention and advising him that filing a false report could get him into trouble we never had a problem again. A more humorous visit was to a site in a depressed area in the hills of Kentucky. We pulled into a gas station driving a government car from the airport that had a red light on the roof. The attendant acted funny when we asked how to get to the site - thought we were revenue agents. We had a visit from the regional office one day and took them on a tour of the Ohio River to visit one of the dams. On looking at the water in the Ohio the New Yorker wanted to know if this was salt or fresh water. We had no radar or satellite input. QPF was just beginning to come into play so we could tell the RDO's how much rain was needed to cause flooding. In 1959 Bud Hiatt asked me to come to Washington to help start a program to make use of radar in flood forecasting. So for many years I traveled much of the country going to radar stations to conduct training and of course visited RFC's along the way. Got to know Mac (McCallister) who later also came to headquarters, great guy.

Dean Braatz: I was the flash flood hydrologist at the OHRFC from the fall of 1976 to summer of 1979. While I was there the IBM 1130 was still in use. The IBM 360-195 came on-line just before I left. They were still using lots of yellow tape to transfer information between teletype machines. Plotting of precipitation and hydrographs was done by hand. There were a few old timers (forgot names) that forecasted the Ohio River while the younger folks did the tributaries. I did not work too many forecast shifts due to being on the road traveling the Ohio River Valley putting community flash food programs together. I remember about one-third of the time I was away from the office. The office was very conservative. You may know of the story where I got in trouble buying a pencil sharpener. The old hand sharpeners were all they had and they were not very good. So I talked the secretary out of the credit card to go to the GSA store next door to purchase an electric pencil sharpener. When I got back into the RFC I was immediately called on the carpet. The PA asked what I was going to do with the new sharpener. Why use it to get a decent point on my pencils was the reply. Management was so shocked not another word was said. But from that time forward we got better supplies to work with. There was a good mix of the older staff and the few younger staff that made things interesting all the time.

Eric Anderson (HRL) reflections on 1964 orientation trip: Carl Relyea was the HIC. The previous HIC had died of a heart attack while in the office not too long before (Dave Smith, later RH for the Southern Region, told about the trauma of that experience as well as showing me around the Cincinnati area). All of the RFC operations were done manually. Fill in the blank mimeograph sheets were prepared that allowed for the calculations to proceed downstream from one forecast point to another. Various charts and graphs were available for rainfall-runoff (API) and routing computations (primarily Muskingum routing). Bill Winston had developed a procedure for doing snowmelt computations using various measurements from synoptic stations (described in the 1965 Proceedings of the Eastern Snow Conference). Bill's procedure was developed

based on his understanding of the Snow Hydrology manual that came out of the 1940/50's Snow Investigations Project conducted by the COE and the Weather Bureau in the west. Walt Wilson, who was part of the Snow Investigations and then working at OH, had tried to point out some of Bill's misunderstandings of the Snow Hydrology material without any success prior to my coming to OH. Bill was convinced his procedure was scientifically correct.

Glen Audsley joined the staff as Principal Assistant in May 1966 under Carl Relyea (HIC). Mr. Audsley came to the RFC from the U.S. Army Corps of Engineers. The staff at the RFC had about six hydrologists and a secretary. When he arrived there all of the forecasting was done by hand procedures, this was interesting to him because he had never done any forecasting before. The forecasters developed their own forecasting sheets/procedures, they were very sophisticated. They found out that using color coding they could add things faster. It was all new to him. By the time he arrived at the RFC the first computer had also arrived and it was a great big thing, may have been an IBM 1620, but it was card operated. Everybody and started to convert their manual procedures to the computer. And his coming knowing nothing about the forecasting methods, the first thing he had to do was to take his turn on each river. Each forecaster had their own river that they were really the best on. After he would familiarize himself that river's procedure, he would move on to the next river. He rotated his turn on weekends using all the charts, so it took quite a length of time to do this. I was not a computer programmer, having no experience in this area before he got to the RFC. And consequently most office management duties fell to him. The HIC and other forecasters devoted nearly all their time to converting procedures. He remembers one time when he had been there about a year Carl Relyea (HIC) telling him there was only one forecaster there had spent any time at all developing new procedures (not converting but new ones), that was Bill Ray on the Wabash River. And I never forgot that, that was important to Carl Relyea. There was a lot of flooding during this time. The RFC was co-located with the WSO, Emmet Baldwin was the MIC there, and Harold Shipley was the River District man, so I learned a lot from Harold. At that time we depended entirely on the reporting by the observers in the field, and I don't mean automation, I mean telephone calls. How much precipitation they had, how high river was. Mr. Audley was at the RFC for about a year and half, and while there he remembers a lot of skepticism among the forecasters on whether the computer ever give the results they came up with, with the hand procedures and knowing the rivers through many years of working with them. That issue had not been resolved by the time he left in February 1968. He understood that skepticism, when we had a number of floods, the forecasters really hand tooled these forecasts, and they took great pride, and if they missed it by 0.3 to 0.4 tenths of foot, they just knew there was no way the computer could do this. Mr. Audsley heard later that when the Ohio RFC did move to using the computer for forecasting, that Carl Relyea had made copies of all the hand procedures and storied them at his home just in case. Beth Audsley recalls an occasion when the HIC asks the wives to help with an open house. This open

house came about in celebration of the new organization, ESSA. She found a babysitter for the kids, got all gussied up and rode the bus downtown to the office. When she arrived she found the office door locked. Due to some overnight flooding, Mr. Relyea had locked the door so the forecasters could complete their forecasts without any distractions.